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Land Forest Wildlife

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DO NOT MOLEST

Land Forest Wildlife

Vol. 7, No. 1

April - May, 1964

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DEDICATED TO THE WISE USE AND MANAGEMENT OF THE PROVINCE'S RENEWABLE NATURAL RESOURCES: ITS LAND, ITS FOREST AND ITS WILDLIFE.

HON. NORMAN WILLMORE,
Minister.

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Deputy Minister.

EDITOR—W. H. MACDONALD

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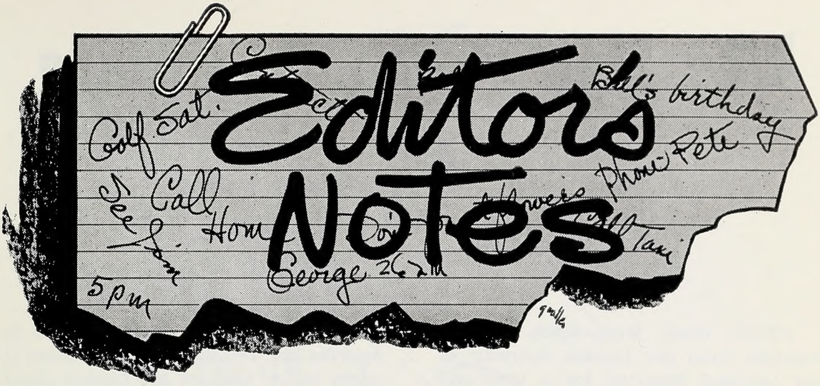


DO NOT MOLEST

Every spring man's invasion of the outdoors invites a conflict of human emotions that is at once endearing and distressing. The concern of the woodlands visitors who bring home "motherless" wildlife youngsters is undoubtedly sincere. And should sympathy become extinct our society would soon perish. On the other hand the capture (and it is nothing less) of wildlife is an offence against government law and for good reasons.

An important premise of childhood education teaches that newly born and immature creatures need protection. The instincts of parenthood are thereby encouraged to include concern for the suffering, the homeless, the deprived, the infirm and the unfortunate among us and, indeed, among our animal neighbors. Nor can we afford to neglect the training of young minds toward understanding the implicit yearning for life by all things "great and small". However, perhaps some consideration should be given to modifying the form of sympathy extended by us to animals: in fairy book tales, on the screen and at the parent's lap. Sympathy for wildlife must stop short of capture, fondling, exhibiting and training if it is to have any commendable purpose. By the very nature of its existence, wildlife belongs only in its chosen environment. Any other surroundings either degrade, or injure it; neither effect could properly be termed sympathetic.

Our gravest error is to impute human feelings to animals. Here we confuse instinct with thought and emotion, habit with perception and death with penalty. In this realm of misunderstanding we conclude that "salvage" of the motherless fawn is indeed a virtuous act and that the forced digestion of trash by undiscriminating strays is acceptable nourishment. We neglect some important facts:—that solitude and semi-starvation are often normal situations for woods creatures, that brevity of life robs them of neither pension nor savings and that domestication is practically synonymous with castration.

We must not stifle the human grace, sympathy; today's need is probably greater than ever before. We may however educate children to be less demonstrative in their regard for the lovable woodland inhabitants, especially the young. We can resist the temptation to cuddle soft furry things, to fondle wet nostrils, to pat glossy rumps and we can stay the hands of our children when they are thus attracted—explaining carefully that while we have regard for all the world's creatures and consider them our neighbours, our ways are vastly different.

Let's leave fawns, calves, lambs, kits and fledglings in the woods this spring. Admire them and seek to communicate with them if you wish but keep that distance apart that allows the young animal to reach its own destiny; if it were capable of speculation it would not wish to adopt ours.

Why Men *Really* Go Fishing

Come live with me, and be my love,
And we will some new pleasures prove,
Of golden sands and crystal brooks
With silken lines and silver hooks.

EVER since Mrs. Isaak Walton watched from her London doorway as her husband departed for a week-end of fishing on the River Lea, wives have suspected that there may be more to the sport of angling than meets the eye.

After all, when a man gets up before daybreak on his day off, to return many hours later, bewhiskered, bleary-eyed, and often fishless—yet smugly contented—one has reason to wonder.

So the question is, "Why do men go fishing?" The obvious answer, to catch fish, just won't do. But if not fish, what is it we seek. What's really behind our compulsion to pursue fish. In perfect honesty, this is a question that we anglers have never faced up to.

The answer, I have come to conclude, is love. If that sounds strange, pause a moment and consider. The typical angler on the eve of fishing season is like a high school freshman preparing to ask his secret sweetheart to go to the prom with him. He can't sleep, can't eat, he is light-headed, giddy, wobbly in the knees, and his breath comes in short gulps. The symptoms are the same in both cases. And so is the diagnosis. It's romantic love.

But romance is only half the story. We also speak off-handedly of having a "passion for fishing," or we refer to a man as being a "passionate angler." Here again we are laying our cast squarely over the rise without knowing it. Fishing is both a romance and a passion.

The problem is that terms such as romance and passion are seriously applied only to the relationship between men and women. So if we use them to describe our feelings toward a sport it might follow that we are talking about a different kind of love. But are we really?

Actually, there seems to be a definate psychological overlap between a man's feeling of romantic and passionate love for a woman, and his romantic and passionate love of angling. The cause of this overlap is not clear, but I suspect that it may have its roots in boyhood when most men begin fishing. As young anglers grow into their teens they find themselves enmeshed in a tender trap, torn between chasing girls and chasing fish. It is at this point that a man either becomes an avid angler and eventually marries in spite of it, or he gives up the sport entirely.

Thus at the very time a man first begins experiencing love he encounters a conflict of desires. In the confusion his romantic urges become vaguely mixed up with fishing. After marriage the conflict still rages, with the angler-husband now torn between family obligations and his desire to go fishing. By transference, man's love of women, which acts in conflict with angling ambitions, carries over into the pursuit of the sport.

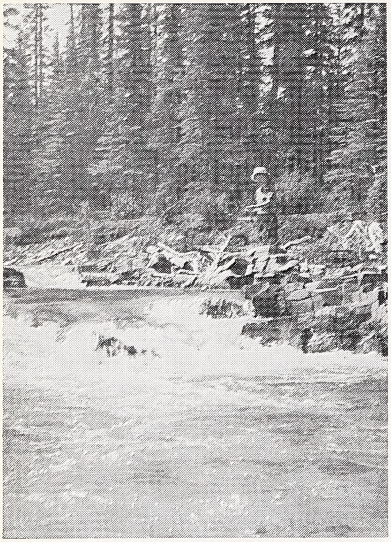
Of course, this is a personal theory. Nevertheless, there is little doubt that a psychological overlap does exist. It even has legal support from no less an authority than Robert Traver, the jurist-author of Anatomy of Murder and more recently of Trout Madness. In his latest book, Trout Madness, Mr. Traver wonders out loud whether man's compulsion to pursue and catch fish may not be

related to "the sexual urges of the fisherman himself."

Under our present customs, he observes, courtship and marriage can get to be a routine affair. "Some men there be amongst us who doubtless rebel at constantly laying siege to an already conquered citadel," he says. Unless they are going in for collecting blondes, fishing and all that goes with it may be the one pursuit that permits them to vent their atavistic impulses and still preserve the tatters of their self-respect."

Interesting though it is, Traver's atavistic theory is not particularly new. The original version had it that because men's primitive ancestors fished for food, the lore of the pursuit got stuck in our natures, and handed down like dew-claws on dogs or appendices in people. Thus, we now do for sport what our cave man forbears did for food. Traver's sexual interpretation makes a lot more sense with one slight exception. He's got hold of only half the apple. He currently sees the passionate side of the overlap, but he overlooks the romance.

In his book, Fisherman's Luck, Henry Van Dyke confessed to being a true believer in romantic love. His only doubts on the subject grew out of "a sedentary life and enforced abstinence



from angling." When he went fishing he returned to "a saner and happier frame of mind."

He explains, "Even on a trout stream I have seen nothing prettier than the sight which I once came upon as I was fishing down the Neversink. A boy was kneeling beside the brook, and a girl was giving him a drink of water out of her hands. As I glanced discreetly at their small tableau I was not unconscious of the new joy that came into the landscape with the presence of a lover and his lass. I knew how sweet the water tasted from that kind of a cup. I also have lived in Arcadia, and have not forgotten the way back."

Van Dyke introduces here still another element in our whodunit. For this "girl by the stream" (with or without her boy friend, but preferably without) is a wraithlike creature that we anglers have been pursuing and writing about for centuries.

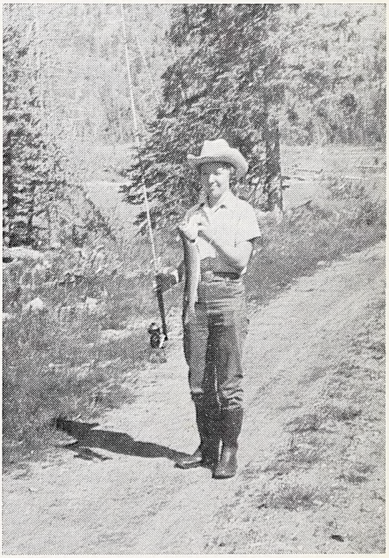
She tiptoes ghostlike through fishing literature under many names and in various disguises. But is always lovely, she has a simple, musical name, and a mystical other-worldliness about her. She is every man's secret dream girl, his personification of the ideal woman.

To Edwin L. Peterson in No Life So Happy she was the lithe, golden-haired Elaine who knew the secret of the King of the trout stream. To Frank L. Stanton she was Jenny, for whom he let the fishing go, to walk with "through meadows with daisies white as snow." And to Isaak Walton's fishing partner, Sir Henry Wotton, she was pink-cheeked Joan with her "neat-rubb'd pail tipping to milk the sand-red cow."

Even Old Izaak Walton, saintly man that he was, seemed haunted by dreams of encountering wood nymphs during his streamside rambles. In several of his poems and prefaces he refers to a wood nymph named Clora. In early editions of The Compleat Angler he tells of hearing Clora sing while loitering long days "near Shawfordbrook." Finally, in 1676, in the fifth addition of The Compleat Angler, Clora the wood nymph takes human form to become "Kenna"—his late wife, Anne Ken.

It is interesting to note that while Walton's wife was living, he pursued an imaginary wood nymph during his fishing trips. But in his old age, after his wife had died, Clora the wood nymph and Anne Ken his beloved wife merged into a single identity. Ah, how sweet the cup of rememberance!

The truth of the matter is that we cherish most what we can never fully



possess. When we have a wife we want a wood nymph, and when the wife is gone we yearn for the wife. When we have romance we want passion, and when passion is fulfilled we long for romance.

Only in fishing do we find the perfect mistress. In fishing we get only fleeting kisses and constant enticement. The great embrace, the completed passion, as symbolized by the fish we pursue, is always tomorrow or around the next bend in the river. The secret is akin to that of the strip-tease dancer. She never shows too much, and we keep coming back in hopes that some day she will.

Fishing offers not only the perfect fulfillment of romantic love, but it contains the promise of passionate love as well. Subconsciously we are always seeking that "girl by the stream." And so we fish from pool to pool, romantically in love, yearning for passionate fulfillment, but never quite achieving it. This kind of a pursuit comes as close to ideal love as mortal man ever gets.

So there you have it. The fact that fishing season opens in the springtime probably accentuates the symptoms. But the underlying motivation is a crazy, mixed-up quest for a nonexistent blend of romantic and passionative love. We never find this heady concoction, of course. It doesn't exist except in dreams and poetry. But in fishing we find the closest thing to it: the romance of the stream, pursuit of a sport, and the vision of the lovely Lorelei who waits for us around the bend in the river.

So the next time you go fishing, just kiss your wife goodby and gently explain, "Goodbye, old dear, I am off to make love to a trout stream and chase a wood nymph across the medows. And don't wait up because I won't be home until late Sunday night."

She will understand perfectly.

Yes indeed . . . ! ! !

Reprinted from:
Pennsylvania Angler

MOSQUITO BEHAVIOR

Where do the mosquitoes go? That is what D.C.D. Happold of the University of Alberta's Department of Entomology is asking. He spent last summer in the wooded region near the junction of the Pembina and Athabasca rivers studying the habits of these insects. Active at dusk and active at dawn, in the middle of the night there was no sign of the mosquitoes.

There are so many things that can affect insect behaviour, and what affects one species of mosquito may affect another differently. With eighteen species active in the area, it is impossible in one short season to more than lay the foundation.

Why do periods of light vary? Why do we find many mosquitoes in certain places and none in others? What effect have light, temperature, humidity and vegetation on these insects in our forest areas? These are a few of the questions the entomologists are asking.

Listing of species and recording of weather and vegetation last year formed part of the investigation. Three distinct types of environment were noted as mosquito breeding places. Water with predominant growth of sedges and grasses was one. Open permanent or semipermanent water as in sloughs or ditches was another. The third consisting of water definitely in the forest with overhanging trees and shady growth.

Particular species breed in particular places says Mr. Happold but there does not appear sufficient variation in the water itself to account for the differences. It may have to do with what the female is attracted to when she lays her eggs. Some are attracted to sedgy pools and others to more open water. One important difference may depend on whether or not the water is shaded by bush.

But about disappearance of the mosquitoes as night draws on. A rise to higher levels would seem the answer and this phase will receive special attention during the coming summer. Platforms will be erected at heights of 20 and 40 feet and observations made from these. During the night, the mosquitoes may migrate upwards in response to the change in weather conditions. Time of rising, periods of flight and other phases of behaviour will be noted and recorded this year.

Reprinted from:
Department of Agriculture
Science and The Land

Albertans have unquestionably donated significant amounts of blood and harvested an equal amount of irritation because of the pesky mosqui-

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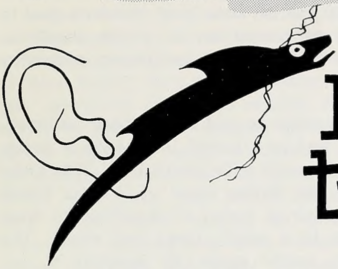


How well do trout hear?

If you have ever quietly approached the bank of a beaver pond only to stumble noisily at the last minute and watched every trout in the pool spook and disappear, it is no news to you that a fish can hear and that it can react to sound. When this happens, there is little else to do but cuss and move on, or wait patiently for half an hour or more until the trout have thought things over and moved back within fly rod reach.

How do trout hear? What can they hear? What is the basic nature of underwater sound? These were some of the questions that come to mind when sound was considered as a possible tool to prevent trout losses from Willow Creek Reservoir. This reservoir, near Granby, Colorado, has long presented a fish management problem because of the large water diversion pumps. The Game and Fish Department and the U.S. Bureau of Reclamation, which operate the reservoir, consequently engaged in a cooperative research project to attempt to control these losses. Prior research with an electric fish screen had failed to solve the problem. Why not try a sonic fish screen? It seemed logical that sound of proper quality could be as beneficial at Willow Creek as it was discouraging to a beaver pond fisherman. Consequently, a series of experiments were set up to investigate the effects of underwater sound on fish movements.

Before discussing the actual experiments and observations, some explanation of the basic properties of sound and its relationship to fish is of interest. All sounds are the results of physical vibrations whether they occur in air or water. Something has to vibrate and to alternately compress and expand the transmitting medium.

The same laws that apply to sound in the air apply to sound in water. Water has greater elasticity than air and is an ideal sound carrier. Sound in water travels at a speed more than four times faster than its speed in air. At the same time, water is 800 times denser than air and considerably more power is required to produce sounds of equal volume underwater.

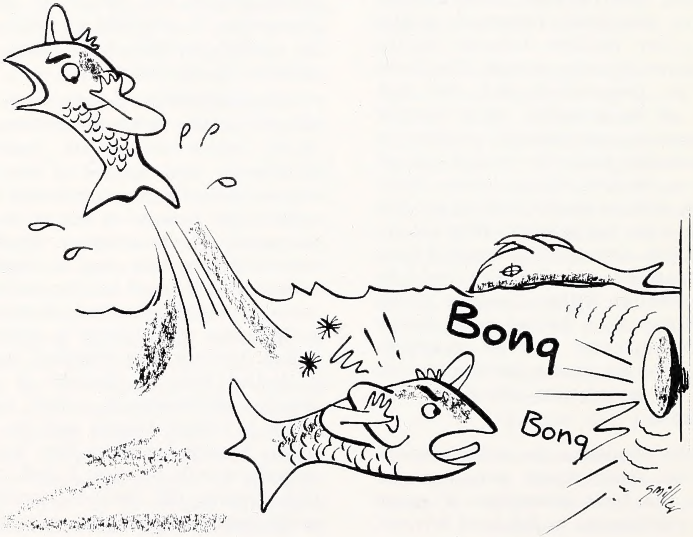
All of the many and varied noises and sounds heard in everyday life are the results of three basic properties of sound. These are simply 1) pitch or frequency, 2) intensity or loudness and 3) quality, resulting from sound combinations or overtones.

Human ears are capable of receiving sounds ranging in frequency from 16 to 20,000 cycles per second (cps.) Man is able to hear sounds of the lowest volume within a frequency range of 2,000 -3,500 cps. Sounds of higher or lower frequency require a higher threshold of volume before they can be heard. The lowest sound heard by the human ear rates approximately zero on the sound scale, which is measured in graduations called decibels. For practical purposes, a decibel may be thought of as the smallest difference in sound intensity which a normal human ear can distinquish. Human hearing can hear and tolerate sounds between 0 and 120 decibels. Above 120 decibels, sounds generally are not heard, but merely cause pain in the ear. The human heartbeat registers about 15 decibels. Normal conversation rates 65 and a pneumatic hammer rates 105 decibels. The third property of sound—sound quality—can perhaps best be explained by citing the difference between two musical instruments. Each may produce sounds of the same pitch and loudness, but each produces a different tone. This is due to the shape or mood of the individual sound waves. "Harmonics" is another term frequently used in discussions of quality of sound.

Relating the foregoing discussion to fish, and trout in particular, most species have a rather primitive, but effective hearing mechanism. The main hearing centers in a trout are called the otolith organs. They are located in the head and correspond to the ear in man. Most trout are able to receive sounds ranging between 16-77,000 cps. They can hear sounds best at a frequency of 800 cps. At this frequency trout can hear sounds as low in volume as the human ear can hear at the optimum frequency of 3,200 cps. In addition to the otolith organs, the lateral line of a fish functions as a receiving organ for some of the lower frequency vibrations. In some cases, the air-bladder is believed to assist the fish in detecting sounds of high frequency although it is not a sense organ in itself. It is also known that fish are able to distinguish sounds of different quality or tone, variations in tones, combinations of tones, and variations in volume levels.

In order to add to this basic information, and to attempt to develop a device which would effectively herd fish away from the outlet canal of Willow Creek Reservoir, a series of experiments were made in a small, clear test canal. The clear water made it possible to accurately observe the reactions of 300 rainbow which were held in the canal. An electronic sound generator capable of producing signals ranging from 300-20,000 cps. was used in connection with a battery of underwater loud speakers. This device was capable of producing a large variety of underwater sounds. Tape recordings of selected underwater sounds were also played back through the underwater speakers. In short, everything was tried with the possible exception of an Elvis Presley be-bop record, all without apparent success.

Several reasons were suspected. First, the range of the underwater speakers left something to be desired. The volume



of these units was greatly muffled by the dense underwater medium. Second, although the trout reacted to a variety of sounds when they were within range of the speakers, these reactions were only momentary or of short duration. It was found that sounds below 5,000 cps. produced the best results. In an effort to gain more volume within the proper frequency range, a powerful electric hammer was connected to an underwater steel plate. This device created a real racket which neared 90 decibels. When the hammer was first turned on, every trout in the canal jumped in panic. One or two even wound up on dry land. The solution seemed at hand. However, in less than a minute the trout had become accustomed to the noise and swam within six inches of the vibrating plate. Pulsations or interruptions of the hammer produced similar results.

One interesting thing was noted throughout the test. The trout were much more easily frightened by movements on the bank, by the operator or observer when the sound producing devices were operating. Thus, working back to the beaver pond, it seems likely that sounds plus visual movement is what sends the trout scurrying for those secret hideouts.

So, you may ask, where are we? Actually, somewhat in the position of the farmer who had just built a better scarecrow. It works fine until the cows find out it is a fake and then it is ignored. Nevertheless, from the standpoint of research the project was successful.

Although the problem at Willow Creek Reservoir remains, we have tested one more possible solution. Thomas Edison found it necessary to test innumerable materials, before he found the correct filament for the electric light blub. There are other possible solutions for Willow Creek and maybe the next one will work. In addition, we feel that the experiments with sound have added to our basic knowledge of trout and may be useful in the future for other research work. And finally how about old man trout, himself? We think he rates new respect. Not only can he hear quite well, but apparently he can pick out just which sounds mean danger, and ignore the rest. It's something to think about the next time you sneak up on that favorite beaver pond.

Reprinted from:
Colorado Outdoors

Loch Leven (brown) Trout

Brown trout fishermen may be excused for believing that their chosen quarry has superlative hearing. Long credited and occasionally damned for its fantastic ability to avoid deduction and capture, the "loch" seems gifted with extra sensory perception.

MOSQUITO BEHAVIOR

(Continued from page 8)

to. The panic engendered on golf fairways, along stream banks and under insecure canvas erupts in blasphemy on most spring evenings. Victims are certain of one mosquito destination; female mosquitoes invariably seek out a warm blooded animal, preferably an enraged, perspiring and exposed human body.

There is only one positive remedy—an acceptance of the fact that irritating insects do exist. Avoid panic and reduce perspiration, seek open breezy regions in the woods for resting or camping, wear light clothing and relax with the knowledge that the total annihilation of mosquitoes is in fact impossible. Insect repellants may help alleviate distress.

A popular anecdote is the one about the bush pilot in Canada's northern regions where mosquitoes are reported to attain monstrous proportions. This near sighted fly-boy pumped 20 gallons of aviation fuel into a mosquito grounded at the aircraft hangar before realizing his error.

Editor.

Going Places in Strange Ways

The way an animal travels reveals its personality like nothing else. It, as a rule, determines success—in defense and escape, securing food and shelter, finding a mate, and having fun. Animals appear always to be going somewhere. Whatever their practical or mysterious missions, an everthoughtful nature has provided the most odd and eccentric of them with extraordinary means for every conceivable type trip to almost everywhere.

A large percent of animals walk as a means for going places. But nothing is more unstandardized than animal walking. They walk—and run when in a hurry—in astonishingly strange ways to accomplish purposes as varied as their mysterious temperaments and desires.

The bulky grizzly bear may appear to wobble his hind quarters awkwardly, and slouch a bit as he saunters about his business. Actually you may have to observe Old Bruin's tracks to truly realize what a careful and graceful walker he is. Viewing a bear trail, you may conclude that a string of bears will walk with more precision and apparent rhythm than a squad of the best trained marching soldiers.

Grizzlies make remarkably straight trails, deviating little, regardless of obstacle or irregular terrain. They not only follow the trail closely, they even step into the same tracks made by predecessors, though these footprints may become more than a foot deep.

The Kiwi, the flightless bird of New Zealand, sways its tailless rear widely from side to side in a featherly burlesque when walking or running. Yet it picks its feet up and puts them down with precision of a rope walker, placing each foot exactly before the other. Some animals, it might appear, are more concerned with the orderliness of the tracks they form than the visual impression they make in motion. Many animals print strange secrets in the tracks they leave.

Few living things appear more habitually lazy and indolent than the

sloth. Yet, if any creature seems to do its walking the hard way, it's this animal. It walks upside down-hanging from limbs of trees.

If a doodlebug, the small inhabitant of the inverted sand cones, should ever back up it would go forward. This ant lion larva always walks backwards.

It is not always numbers of limbs that count in covering ground. When the Australian frilled lizard shifts into high gear its front legs and head raise from the ground.

Many animals travel exclusively by jumping—some species of frogs, for example. Others more often jump for momentary advantages.

Never attempt to determine the height or breadth of a jump by the size of the jumper. The little Canadian jumping mouse can do a broad jump of over five feet. However, the mouse-size African jerboa can almost double that record. And don't trust a spider to be ground bound. Some can jump as far as eight inches. Snakes, however, contrary to a popular belief cannot jump, though many can strike virtually the length of their bodies.

The grasshopper and kangaroo are noted for getting placed on the top. But the world's champion jumper is the flea. This diminutive pest can jump farther and quicker into and out of more unwelcomed places than any creature known. It can jump several hundred times its length. At top speed it shifts to hind leg power only. This is a case of a runner, when in a special hurry, pickin' 'em up and not putting 'em dawn.

Strangely, legs are not necessarly for walking. A species of fish walks on dry land. More astonishing still it climbs trees. It employs fins and tail to propel itself.

You may not be able to guess what system of locomotion a creature will use until you see it take off. If you surprised a crab, it would lose no time maneuvering for position to run. It can start from any position in any direction without turning. For just ordinary strolling, sideways is the usual choice.

Animals seem to prove that it comes to walking it can be done by someone in just about any conceivable way.

Many animals use combinations of propulsion methods. Gibbons "fly" through the trees with the greatest of ease—sometimes in leaps of forty feet or more. Scared American cougars have been known to leap safely more than fifty feet downward when cornered.

There are some queer quirks to animal jumping. A kangaroo can't jump if its tail is lifted off the ground. And some creatures possess the amazing capacity to jump and carry their domicile with them at the same time. The maggot in the jumping bean has the mysterious power to lift itself and the bean that houses it clear of the ground. This jump is accomplished by alternately contracting and relaxing its body.

Everyone knows that the mode of

travel for most birds is flying. But many creatures other than birds fly.

No less than twenty-one species of lizards fly. These are tree dwelling lizards that frequently desire to travel from tree to tree, like the birds, without going the long way around by ground. They are able to fly by means of outgrowth of skin along their sides. A variety of squirrels fly—or more properly glide—in similar fashion.

A variety of fish flies. They use fins for wings.

And even the lowly snake, normally regarded as condemned to crawl on its belly forever, takes to the air in some instances. A snake in Borneo sails from tree to tree by flattening and stiffening its body into a straight line. It tucks in the undersurface of its body, forming a hollow area, which acts as a resisting surface to the air during flight.

Standard means of travel for fish is swimming. But an account of their innumerable extraordinary ways of swimming would fill a sizeable book.

The sea horse swims in unique fashion for a fish—in a vertical position, head at top, tail at the bottom. The flounder, instead of swimming upright as most fish do, turns over on one side. Its eyes, to better serve it in this unorthodox position, have moved around to the upper side,

Water is not the only medium for swimming. A number of lizards swim in sand—both on and through it.

Long before man learned to impel himself by jet propulsion, water creatures were accomplishing the fast journey by forcing jet streams from their bodies

Many water bugs whisk across the water surface considerably faster than their fin or leg propelled neighbours.

The scallop has long lived in a rocket age. A powerful, active closing-muscle, which can open and close the shell in a fashion to take in water and quickly expel it, produces a spasmodic rocket-type propulsion. The scallop may go hurtling upward, then travel a fair distance horizontally, or skim along the bottom so fast it leaves a cloud of sand or mud in its wake.

Some members of the animal kingdom go their seemingly merry ways just rolling along. A number of insects make a ball and roll to wherever they are going. A few flip head over tail, springing themselves to their destinations in much the fashion that a clown may hurtle himself along head over heels doing looping hand springs.

The South African shrew, whose legs and feet are virtually useless for walking upright, curls up into a ball and rolls along the ground.

With some animals the most difficult or tedious part of travel is the take-off. The flying fox, the largest bat, launches himself in only one way—by dropping from a hanging position. If he becomes grounded, there is only one way to get airborne again — climb a tree and hang himself.

Another upside-down launcher is the great titmouse. This bird drops with wings closed for over a yard before taking off on its own wing power.

The worst hazard to some travel is the landing, rather than the take-off. The argoli, the world's largest sheep, is a noted jumper, yet when he jumps he lands not on his feet, but on his horns.

Unless you understand something of an animal's means of movement you may never know how it eludes you, or gets to the strange and seemingly inaccessible places it inhabits or visits.

Reprinted from: Wyoming Wildlife

Some animals have "CLOCKS"

WASHINGTON—Many animals and plants have remarkably accurate "clocks" built into their nervous systems or other parts of their bodies.

Observations supporting this theory have just been reported by the American Institute of Biological Sciences. In only a few instances, however, is the actual mechanism of clocks known to biologists.

There appears to be some relation to the natural rhythms of the earth—the solar day, the lunar day and the sidereal day—to which the organisms have evolved to adjust themselves over milleniums.

Swarming of Midges

A striking example cited is the annual swarming of midges, which begins on precisely the same calendar date each year and occurs at precisely the same twilight hour, on two successive evenings.

Bean seedlings have been found to have a different sleep pattern—elevated leaves by day and drooping leaves at night—even when light and temperature do not change, but different strains of seedlings grow in identical levels of light and temperature develop quite different daily rhythms.

A recent discovery reported has been that of a "clock gland" in the head of the cockroach which is closely associated with the activity of these insects.

It can be "stopped" by exposing it to cold while the rest of the roach is kept at room temperature.

If the chilled gland is surgically transplanted to a roach whose normal activities have been stopped, this roach will show a daily activity pattern timed by the implicated clock.

Drastic Change

A drastic change—death from intestinal cancer—results when the roach clock glands are reset to a time 12 hours different.

Studies with crabs and bees, says the report, indicate both maintain an accurate daily rhythm even when sealed away from their natural environment and carried thousands of miles east or west.

The clock glands appear to operate independent of every external clue.

"It has been found," says the report, "that living systems are astoundingly sensitive to very weak electrostatic and electromagnetic fields of radiofrequency, to which man is quite insensitive."

Reprinted from:
The Calgary Herald
January 19, 1963

ANIMAL SENSORY SYSTEMS

Through the centuries man has used his imagination and skills in attempts to adapt materials in his environment to applications which would give him an advantage over his environment, an enemy, or a competitor and to enjoy a higher standard of living. In his constant endeavor to control his environment (rather than to allow his environment to control him), man has studied the nature of animal instincts, their environment adaptations, functions, and attributes peculiar to these forms of life, and has used this knowledge to devise methods of duplicating such biological systems to his advantage.

The process of natural selection, regulated by the familiar "survival of the fittest," has endowed creatures of nature with abilities, sometimes peculiar to the species, which by man's standards appear as amazing, fantastic, and spectacular accomplishments. For example, the bat has remarkable acuity of hearing. It can distinguish the echo of its own shrill cries as it strikes objects in its flight path and can thereby use this natural sonar (SOund, Navigation, And Ranging) system to guide its flight through a dark thicket or man-made maze. The ant has the ability to lift a load eighty to a hundred times its own weight—a more reasonable feat for a character from science fiction than from a seemingly weak insect.

Some animals demonstrate remarkable navigational abilities. For instance, the Arctic tern travels some 22,000 miles round trip as it migrates from the Arctic to the Antarctic each year. The species of the family Salmonidae swim hundreds of miles against swift rapids and even negotiate waterfalls as high as ten feet to spawn in the exact headwaters in which they were spawned.

In the very early stages of the evolution of bionics the applications of observed natural functions to useful man-made devices were of the more fundamental nature or simple copy and imitation of what man observed in nature—for example, the cave man's use of animal fur and skin to clothe himself, or the concept of the knife, gained from observing the fangs and claws of familiar animals. As man became more sophisticated, so also did his adaptations of biological knowledge become more sophisticated, as well as more complex and scientifically useful.

It seems likely that the American Indian studied the protective mechanisms (characteristic markings and obliterative shading) of snakes, lizards, birds, and insects, making use of this knowledge in tactical warfare applications. This identical adaptation was later given sophistication during World War I and became known as camouflage.

Bionics, the discipline which uses biological materials as engineering prototypes, is confronted with numerous problems and difficulties—difficulties, it is hoped, which can be overcome through determined efforts. It appears that the biologists of the past have done a good job of describing organs, organelles, and biological processes, but principally in a morphological frame of reference. To be suitable to engineering adaptability, data relative to biological processes must be mathematical or quantitative.

Quite naturally, bionics research has required the blending of the talents of the biologist, who can best recognize and define the attributes of living organisms under study, and the electronic or physical scientist, who can best adapt conventional equipment and materials to function analogously to the biological system described. Bionics has been late to develop into an active, recognized specialty, due to the limited number of persons knowledgeable in both biological and engineering sciences. Biochemistry and biophysics afford good examples of such crossing of disciplines, involving biological sciences, that have undergone extensive development and growth within the last quarter century. There is a growing awareness among educators in the sciences of the urgency and need for new university curricula in which such interdisciplinary science study is further stressed.

Certain devices which duplicate, or at least apply, underlying principles originally observed as natural functions of animals, already serve man to great advantage. Since World War II, the association of radar (RAdio Detecting and Ranging) and the echo-ranging system of the bat (an association that has perhaps been overdrawn in popular magazine articles) tends to leave the general impression that radar was developed from a study of the ranging system of the bat. The orginal concept of radar was developed not from biological observations but from early studies of electronic wave forms at the Naval Research Laboratory. A. H. Taylor and L. C. Young in 1922 observed reflections from aircraft as far as 50 miles away. Much of the development work on radar just prior to World War II was accomplished by British scientists, and as a result of their efforts radar became operational as a tactical tool for warfare —none too soon.

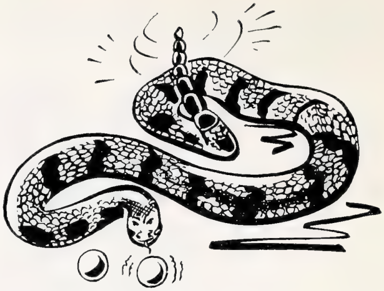
Two highly successful countermeasures employed by enemy forces, however, are able to reduce the overall effectiveness of radar. Radar is susceptible to

jamming by high-level interference, and it is not sufficiently selective to discriminate and identify individual emitters through the interference.

If we now return our attention to the bat and its highly-selective sensing mechanisms (by which it is made aware of stimuli), it is easy to see why bionics research in this area is given so much attention by the military. The ultrasonic receptors of the bat enable it to fly successfully through intricate patterns of obstacles in total darkness (even blinded) without collision. The bat has the ability to discriminate echoes of its own vocalizations reflected from a mosquito or moth when the background noise is 2,000 times stronger than the level of the echo. These sound waves have been found to be in the range of 50,000 to 100,000 cycles per second (cps), well above that of human auditory sensitivity (which, in healthy young adults, ranges from 20-18,000 cps).

It is even more spectacular that the bat can discriminate the echo of its own vocalizations from similar (if not identical) vocalization of thousands of other bats in the same cave, in spite of this high ambient noise! Military scientists are particularly interested in this phenomenon, because successful electronic applications of this biological system could be used to discriminate "friendly" radar emissions from those of the enemy and concomitantly ignore the enemy's radar-jamming devices. The Navy is currently conducting experiments with a species of bat that apparently combines its natural radar with natural sonar, for this bat has the ability to skim over water and accurately detect and snatch fish from below the surface.

Other animals also have similar auditory ranging, detecting, and sensing mechanisms which, in some, is accomplished with a relatively simple nervous system. For example, the two-cell ear of the noctuid moth (which contains only three nerve fibers) can detect and discriminate the sound of a predatory bat, as far away as 100 feet, from a noise level lower than our most sensitive microphones.



A biological mechanism more nearly analogous to our electronic radar can be observed in species of fresh water families of fish. These fish emit pulsating direct current, creating an electric field which surrounds their bodies. Dr. H. W. Lissman of Cambridge, England, has observed that through delicate receptors certain fish are able to detect minute disturbances within the field in the order of three-trillionths of a volt. Such disturbances are decoded by the brain and interpreted in terms of recognition, ranging, and orientation.

An infrared sensory mechanism is still another means by which biological systems serve some animals for navigation, stalking their prey, or warning of predators. The pit vipers (the rattlesnakes, copperheads, and cottonmouths) have infrared receptor cells located in deep facial pits on each side of the head, midway between the eye and the nostril. These cells serve as sensory mechanisms, sensitive at the surface to 0.001° C for the orientation of prey and as an extremely delicate warning device. To demonstrate the ultra-sensitivity of these cells to infrared radiation, Dr. T. H. Bullock, of UCLA, has shown that if offered two identical balls, but different by a temperature of one-tenth of one degree, a rattlesnake will unerringly strike the warmer ball. The brain is so controlled by this organ that even the head of a decapitated snake has been known to bite warm objects (man).

The recent interest in missile tracking and guidance systems of antimissles has stimulated interest in this area of bionics. Biomedical electronics has likewise found very useful applications for sensitive infrared scanning systems and heat detectors. Certain cancers have been observed to radiate slightly more heat than the surrounding normal tissues, possibly due to the higher redox potential. Sensitive infrared detection devices might be able to more clearly define the area of cancer growth than with presently known means. Infrared scanning devices have also been used to detect the depth of frostbitten or burned areas of the skin and to predict the onset of gangrene in suspect cases.

Natural body fluids, toxins, and secretions of certain animals have been given detailed study by bionicists. Marine biologists of the Navy are particularly interested in finding chemical substances which will repel sharks and barracuda. In much the same way that insects are repelled by chemicals (for example, a mixture of phenylcyclohexanol and tetrahydronaphthalene — the familiar "488" mosquito repellent developed by the Naval Medical Research Institute during World War II), there are numerous examples of natural repulsing and protective odors and exudates under study. A bitter irritating mucoid fluid is secreted by some frogs, salamanders, and slugs.

Various species of insects produce vile repelling fluids to ward off predators. The squid's use of the liquid "smoke screen" is even found in legendary sea lore! Biochemical investigations of insect toxins provided the groundwork for early development of the "nerve gasses" studied in World War II. It was found that the action of acetylcholine esterase, producing an excess of acetylcholine in experimental animals, caused incapacitating symptons—apathy, prostration, and central nervous system disfunctions. Collateral research in this area revealed that these symptons can be relieved by massive doses of antropine. Dr. R. T. Yamamoto, of the USDA laboratory at Beltsville, Maryland, has observed that the female cockroach (Periplaneta americanus) exudes a sex lure identified as 2,2-dimethyl-3-isopropylidene-cyclopropyl proprionate to attract male roaches (Time, January 18, 1963). It appears that the male roach cannot resist its attraction so that it is an easy matter to lure the males into baited traps, but the female are not in the least attracted and, in fact, without mating, secrete even more attractant to compete with the trap.

The basic unit of the nervous system is now recognized to be the neuron from the "neuron doctrine" of Cajal. The discovery of all-or-none phenomenon (impulse or spikes) is single nerve fibers, lasting approximately one millisecond and followed by a nonsensitive refractory period, was an important step in the evolution of neuron bionics. It is the functional nature of the neuron impulse and the method by which transmission of the impulse proceeds which is of vital interest to the bionicist. The obvious role of a neural network is to transmit and process information, regardless of the character of the source of energy.

Electronic neuron models have been given a variety of names by their creators: neuromime, neutrisor, Artron, and reron. Through the study of these models, it is believed that a better understanding of the nature of biological neuron systems may be ascertained. The nature of the nerve impulse transmission can be further characterized (electrical potential and frequency) with a sensitive oscilloscope, by tapping the bundle of nerve fibers from a biological sense organ. Bionicists at MIT have successfully tapped the nerve fibers from a frog's retina with microelectrodes. By moving variously shaped objects in the visual path of the eye, or by changing the speed of objects, light intensity and size of the objects, these scientists were able to trace the functions of the eye. Possible applications of a device of this nature include an indicator of ground speed from planes or missiles in flight and improvement of moving target detectors.

Although the nerve impulse can be measured as a function of electrical potential with a known frequency constant, the impulse transmission is believed to be electrochemical in nature. The evidence for this assumption is based on two observations: (1) the speed of the nerve impulse transmission is of a much slower order than would be expected if the impulse were purely electrical, and (2) the all-or-none law of the nerve impulse clearly characterizes the process as a reversible biochemical reaction requiring a recovery period before being capable of conducting another impulse. If purely electrical by nature, there would be no recovery period necessary, and the frequency of the transmitted impulse would be considerably more variable.

Many other interesting biological functions and characteristics have stimulated research in the field of bionics. A few of these are briefly mentioned below:

1. The ability of the honeybee to navigate by a fix on the sun.
2. The homing ability of the pigeon and swallow.
3. The winter hibernation of such animals as the bear, hedgehog, and frog.
4. The pressure sensitive sensors of the spider's legs.
5. The selective receptors for polarized light characteristic of certain insects.
6. The ultrasensitive odor-detecting mechanism of the bloodhound.
7. The mechanism by which the eye selects and correlates optical data prior to transmission of this information to the brain.

No evolutionary process is ever a predictable and orderly affair; therefore, man's adaptation of nature's methods can seldom be categorically summarized as direct analogues of identical biological manifestations observed in the product of nature. Unquestionably, bionic endeavor will attempt, in the future, to duplicate, rectify, and adapt interesting principles observed in biological systems to creative possibilities in electronics and mechanics. Considering advances made to date in the field of bionics, the future may well be as different from the present as the present is different from the past.

Reprinted from:
Alabama Conservation.

The FALLACY of BURNING

Burning is an agricultural tool; it has a proper use and place, just as pesticides do, but the misuse of these tools is what really does the harm. For example, burning to clear an irrigation ditch of wind-blown weeds that would obstruct water flow is a logical use of the burning tool.

But burning fence rows or exterior ditch banks or any uncultivated corners simply to remove weeds or weed-seed sources can be harmful and is fallacious. The ultimate in absurdity is the burning of cattails and rushes in seep areas. These plants are strictly confined to low areas because of their water requirements, yet each year extensive areas of these low, bottom lands are burned for no apparent purpose.

Here are some points for farmers to ponder:

1. Despite popular beliefs, burning does not reduce the weed problem. In certain instances it may even increase weed growth. Many of our undesirable weeds are the most resistant to fire. For example, the Canadian thistle which comes up from its roots is not damaged by fire. Removal of the less objectionable weeds may only provide a seed-bed for noxious weeds. One has only to look over areas that have been burned annually for many years to find proof that this practice does not eliminate the weed problem. On the other hand you can find areas that have not been burned and the weed problem is gone. Plant succession has taken over and the weeds have been replaced by grass although succession can take years and years. Many highway shoulders that haven't been burned or disturbed now have a fine cover of natural grasses. In borrow pits grass frequently grows high enough so farmers can harvest it and gain some value from this native forage, adding to their crops.

2. Burning prevents the return of valuable organic matter to the soil. This results in the deterioration of the soil structure as well as the loss of valuable elements that would go back into the topsoil.

3. Burning frequently gets out of hand and destroys valuable property. Trees, homes, fences, bridges, farm machinery and buildings adjacent to the burned fields are often damaged. Even controlled burning shortens the life of the fences and utility poles and lines. This means frequent and costly replacements involving both time and money.

4. Burning removes the vegetation which holds snow in place and improves the soil moisture content in the spring and removes the vegetation which protects the soil from surface erosion.

5. Aside from accidental damage, burning wastes a lot of individual time and energy. County road crews devote weeks of valuable time to spring burning and little, if any, benefit is derived from this work.

6. Burning provides such momentary heat that grasshopper and other insect eggs buried in the soil are usually not harmed by fire. Weeds often act as a buffer for grasshoppers, and when removed, 'hoppers move into the crops and hit the farmer where it hurts most.

7. Last, but far from least, burning destroys the food and cover that is so essential to wildlife. Intensive agriculture leaves very little uncultivated and ungrazed areas for wildlife survival and production.

Reprinted from:
Colorado Outdoors.

L F

IN PUBLIC SERVICE

Department of Lands and Forests

T. R. HAMMER

When Ted Hammer, Alberta's Senior Superintendent of Forest Protection, retired from service on March 30th, 1964, it was as if one of the giants of the spruce forest had toppled to earth. Ted's departure left a large gap in the ranks of his associates and his shoes will be hard to fill.

As a young trail crewman, Theodore R. Hammer hired out to the federal forest service at Hinton in 1929. His duties involved long days in the saddle, keeping fire fighting access trails open, repairing culverts and adding such trail improvements as his limited bundle of hand tools would permit. Most of his trips were made alone and often he would be on the trail for 4 weeks at a stretch.

In 1933, Ted Hammer received a temporary appointment as a provincial government forest ranger. He has remained with this service, becoming chief ranger and timber inspector in the Lac La Biche division in 1941 and forest superintendent of the Grande Prairie division in 1953. Shortly thereafter he was promoted to senior superintendent and transferred to forestry headquarters in Edmonton.

The Hammer family are Alberta pioneers. Ted's parents came to the Leduc-Calmar region in 1899, the year of his birth. Their first house was a simple cabin with a sod roof. Ted later met and married Ella Westland in Edmonton. The Hammers have three children, two daughters, Jeanne and Shirley, and a son, Jim.

The stamp of a simple birthright has remained with Ted throughout his years of service. He is still an "earthy" individual in a most attractive way. He learned about the value of teamwork in an elemental rural environment and his final complex administration stressed team organization to a remarkable degree. The fortunate bearer of an unselfish attitude, Ted delegated authority readily and with skill. He was a most objective administrator, taking the long view into consideration at every step and planning constantly to the mutual advantage of his responsibilities and his staff.

The merit of Ted Hammer's supervision is readily acknowledged by all

(Continued on page 23)

CONSERVATION IS NOT WISE USE

CONSERVATION, to be effective, must include love for the thing to be conserved and a refusal to ask only how useful it is. We must assume—whatever words we may use—that "nature's children all enjoy her care" and that they are all part of "the wisdom of God".

Some teachers of biology in the schools and colleges of the United States recently have expressed concern over the fact that theirs is not a popular subject. It is, of course, "required" for premedical students but few elect it unless they already have determined to make biology a profession. Even more alarming is the additional fact that of the few who do elect an elementary course only a very small minority ever choose to pursue the subject further.

Much is being said, not only about the practical importance of science, but also about its importance as a way of understanding and "adjusting to" modern life. Much favorable comment was provoked by C. P. Snow's recent ridicule of the "culture" of the so-called cultivated man who knows little or nothing of modern science. Yet even those students who respond to such contentions seem to prefer the physical to those biological sciences that might seem more relevant to culture as opposed to technology. Nearly all children are interested in animals. Why should so few adolescents care to study them in colleges?

That question was pondered by a foundation-supported Biological Sciences' Curriculum Study under the direction of the American Institute of Biological Science. An answer to the question has been implied: "Because the biological sciences are improperly taught."

Just how they ought to be taught still is being pondered. So far as I know, no member of the study committee has been willing to say simply: "in such a way as to encourage an attitude that includes a sense of the joy and consolation of sharing the universe with other living things." However, there are some to whom the encouragement of this attitude is not wholly sentimental and unscientific.

It may be that the attitude of biologists and the way in which they teach their subject may determine, as much as poets and "nature writers", what the earth will be like a century from now.

Joseph Wood Krutch
Reprinted from:
Maryland Conservationist.

T. R. HAMMER

(Continued from page 22)

who worked with him. It grew largely out of the man and illustrates how well he coupled integrity with the desire to accomplish.

Ted was persuaded to pass along a few of his views regarding people and attitudes for the benefit of his juniors and others. They express the character of the man far better than any description might. Following are a few of the phrases he used in interview: "Do not measure accomplishment by its effect on yourself." "Constantly seek information about the job you are doing." "Evaluate useful information in terms of job needs." "Be generous with proven ideas; pass them along." "Appreciate assistance and cooperation." "The long view is necessary to accomplishment." "Seek to train subordinates." "Don't be carried away by tinsel and monuments." "In fire suppression the lookout or towerman is the key to effective action." "Continuous proof of efficiency is necessary." "Honor a verbal contract." "Respect all people with whom you associate." "Grow with an organization." And about himself on the subject of retirement, "people get out of step as they get older", indeed a most gracious admission from an admirable man.

IN THE MAIL

Letters to the editor will be published under a pseudonym if requested but they must be accompanied by the writer's proper signature and address. Letters are welcome and particularly so if they are brief and deal with a topic currently being treated in Land-Forest-Wildlife or with one of general interest in the field of renewable natural resources. Land-Forest-Wildlife reserves the right to decide whether any letter shall be published in its columns and to condense any letter.

KANANASKIS - SPRAY LAKES

Editor:

We find your magazine most interesting and are particularly interested in articles on fish stocking programs. Being ardent fisherman we are quite concerned with the deterioration of fishing during the last ten years, particularly in the Barrier, Spray and Kananaskis Lakes.

These lakes used to have a great number of fish which gave wonderful sport but during recent years the Barrier and then the Spray either got fished out or the fish stopped biting. Last year fishing was also much poorer in both Kananaskis Lakes. Since we are concerned that this may be a trend we are wondering if there is any program of stocking being carried out in these lakes. We feel with these lovely spots, and many others, available for stocking that a more concentrated effort could be put forth to make these spots a fisherman's paradise.

Mr. and Mrs. F. W. Thompson,
Calgary, Alberta

The Thompsons' complaint is echoed by other Kananaskis fans. The degree of excellence of the sport fishing in this area has been a research subject for several years. Some conclusions are established:

(1) Kananaskis and Spray lakes, as now constituted, will probably never regain their former productivity largely due to water level fluctuations resulting from hydro-electric demands on these reservoirs.

(2) Neither lake has been "fished out". Anglers could not possibly remove sufficient fish from reservoirs of this size to seriously deplete fish stocks and commercial fishing is prohibited.

(3) Both Kananaskis and Spray lakes have been stocked with fish. Over one million rainbow fingerlings were put into Kananaskis lakes in 1959 and 1960. Adjacent beaver dams have been stocked with eastern brook and rainbow trout on three successive years since 1960. At Spray lakes $6\frac{1}{2}$ million eyed tullibee eggs, 300,000 lake trout eggs and 100,00 lake trout fingerlings have been stocked to try and create a fishery that would suit the water fluctuation of a hydro-electric reservoir. Initial success has been obtained; lake trout catches are increasing.

We agree with Thompsons that these are lovely spots and we know them well. However, Alberta has yet to see an example of a hydro-electric impoundment that did not depreciate both the scenery and the fishing at the site of development.

NORTH WEST ELK

Editor:

I receive your Land-Forest-Wildlife booklet and enjoy it very much. In the Jan.-Feb. issue the topic on Elk in North West Alberta was most interesting. I happened to be in a party of six of us that hunted elk along the Cutbank river the first three days of the season last September. In table 1, page 20, it shows that there was 26 elk came through the Wapiti checking station in 1963.

We brought three bull elk through there that I don't think were counted as there was no checking point set up there at that time.

I think the elk are also moving in the Saddle Hills area too, as my neighbour saw a cow elk along the edge of his field here last fall. He saw it on three different occasions within 300 yards of his house. He showed me the tracks and it was elk alright.

If they are here I would like to see the season on them remain closed until they have a good chance to multiply in this area. This was in Section 1, Township 75, Range 8, West of the 6th.

Would it be possible for you to send this booklet (Land-Forest-Wildlife) to two of my friends.

Yours truly,

Morris Eady,

Buffalo Lakes, Alberta

We were very pleased to get Mr. Eady's letter and hastened to pass it along to John Stelfox for his records. The note about Saddle Hills elk is undoubtedly of interest to biologist Stelfox.

Correspondents like Mr. Eady make the dispositions of editors and biologists equally happy. Thanks for taking the trouble to write.

Type of House Tips 'Go-Getter' Insect

You can tell a go-getting tent caterpillar colony by the kind of web house it weaves.

Vigorous caterpillars also grow into equally-vigorous adult moths whose females pioneer in spreading active progeny far afield.

But the sluggards stay at home and in a few generations may reach the point where the caterpillars literally starve to death within their webs, Dr. W. G. Wellington of Victoria told the Canadian Centenary Entomology Conference recently.

Dr. Wellington, who is with the British Columbia forestry department, was describing study of a species of tent caterpillar on southern Vancouver Island.

The leaf-eating progeny of the adult moths are plainly divisible into very active, active and sluggish groups with any colony, he said.

Isolated colonies tend to be vigorous because they sprang from a female capable of travelling some distance.

Vigorous colonies built long and slender web houses while the least active group formed squarer, more compact shelters.

It had been observed that colonies on farmland were denuded rapidly of the active adults who took off for new territory. Adults developed from less-active caterpillars tended to sit and produce sluggish offspring, leading to deterioration and eventually eclipse in some cases.

Conditions were different in forest areas.

Active female moths might soar 50 feet or more before setting out for parts unknown. In forests, they still might not get far because good spots to lay eggs were provided in tall trees.

Tests showed that active moths laid eggs higher up than other groups.

Dr. Wellington said the project now is turning to study of whether nutrition has something to do with why active female moths produce active offspring. Later, genetics would be included.

BUMBLEBEE PREDATORS

(YOU THINK YOU HAVE TROUBLES?)

Insects have their cuckoos too, and one of these does its share towards reducing populations of the valuable alfalfa and red-clover-pollinating bumblebee. Laying its eggs in the bumblebee nest and relying on the bumblebee workers to feed its young, it is well named the cuckoo-bee.

Itself a bumblebee, it has evolved away back from bumblebee ancestors. But it has lost the faculty of carrying pollen and must rely on the true bumblebees for this task. Dr. G. A. Hobbs, Forage Crop Insect Specialist at the Research Station, Lethbridge, tells about it.

The cuckoo-bee searches for the nest of a bumblebee, he says. When she finds one, she enters and takes over. It was once thought that she destroyed the bumblebee queen. But recent studies have indicated that this is not correct.

She dominates the bumblebee queen, however, perhaps by destroying the eggs as they are laid, but the two queens seem to live together in comparative harmony. What we do know, says Dr. Hobbs, is that in almost all cases no bumblebees are produced after the cuckoo-bee enters the hive.

The cuckoo-bee has proved a nuisance in the artificial hives used in the Lethbridge studies for increasing bumblebee populations. But means have been found of keeping her out of the nest. Since she is larger than the bumblebee workers, a reducer at the hive entrance serves the purpose. With this excluder in place, the workers can go out, but the queen can't get out nor can the cuckoo-bee get in.

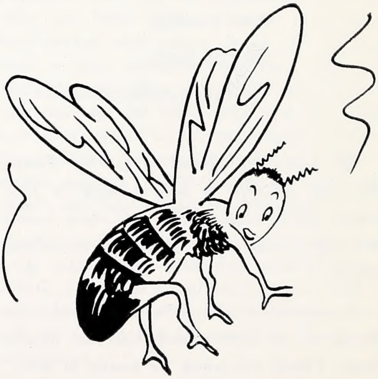
Another enemy that takes its toll every year is the big-headed fly. This is a slim-bodied, wasp-like fly with a big head and big eyes. Its wings are brown-blotched, and many of these insects are found in our legume seed fields.

Unlike the cuckoo-bee, the bigheaded fly attacks the bumblebees directly. It sits on a flower or blade of grass near the hive entrance. When a bee arrives or departs, it flies up and lays an egg on the abdomen of the bee. The larva that emerges consumes the contents of the abdomen and the bee dies.

This may not be too serious when a worker is the victim since it is only one of a larger force. But when a foraging queen is parasitized the whole hive is destroyed. Here again the excluder serves a purpose. The big-headed fly does not enter the hive, so if the queen can be kept in she is safe from attack.

This is just another aspect of bumblebee propagation, says Dr. Hobbs. Nature is extremely complicated and there are so many angles. It will never be possible to tell in two simple pages how to manage bumblebees. Knowledge and experience are the requisites, and both study and application are involved.

Reprinted from:
Science and the Land



NO GUARANTEE

The word GUARANTEE is not written on any license sold by the Department of Lands and Forests.

Almost every day Department officers hear the complaint: "I have fished (or hunted) all day and have nothing to show for my trouble. I want my license money back. I wuz robbed."

And many people feel robbed. After all, they paid good money for a license. And they hunted or fished all day. And so now it is up to the state to do its part by guaranteeing their bag limit.

There is an adequate amount of game, regardless of the species, for all sportsmen. But, as any veteran sportsmen will tell you, having the game available and harvesting it are often two different things.

The catch is that it is up to the individual sportsman to take his game in a legal manner during the proper season. His success can depend on such things as the weather, road conditions, his physical condition and luck. Hunting and fishing are like any other sport. There is always an element of chance and it takes a good deal of practice and skill to become proficient. Just because a person possesses the necessary license, the success of the hunt is in no way guaranteed.

The fact that a sportsman owns a bowling ball does not mean that he can bowl a perfect game every time. No experienced bowler would claim that a person who had only been bowling once would be able to enter into professional league competition. But sportsmen feel that regardless of experience or skill they should be able to fill their bag limit every time.

One guarantee is included with every license sold by the Department of Lands and Forests. That is the guarantee of the privilege to attempt to take the game provided for on the license in a lawful manner. The taking of the game is up to the individual. And, as with any worthwhile sport, if one were successful every time at a minimum of effort—the challenge would soon be gone and there wouldn't be much sport to it.

Reprinted from:

New Mexico Wildlife Magazine

NOTES ON WILDLIFE

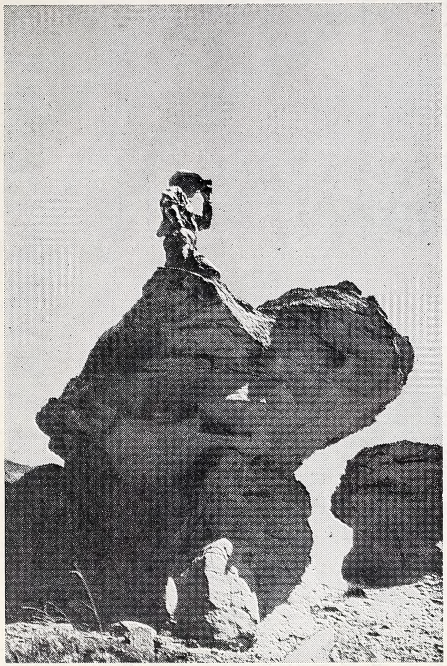
Coyotes sometimes go into water after fish, crayfish, frogs and tadpoles. In winter they sometimes fish through holes in the ice . . . Wood rats live alone except when mating or raising offspring and usually occupy one home for a lifetime . . . The bighorn sheep sometimes gets salt by chewing a sulphur-salt flavored rock known as decomposed rhyolite . . . The porcupine sheds its quills just like fur but never loses and replaces them all at one time . . . Although the bobcat is a good climber it climbs trees only occasionally—for refuge, rest or food . . . The mink is a versatile hunter—quick and agile enough to chase down and catch fish in a stream . . . The grizzly bear's eyesight is poor, but its hearing is excellent and its sense of smell virtually unsurpassed.

Reprinted from:

Wyoming Wildlife

—DINOSAUR PARK—

Red Deer River



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